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IMPORTANT FOREST INSECT OUTBREAKS IN WESTERN NORTH AMERICA DURING 1958

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IMPORTANT FOREST INSECT OUTBREAKS
INTERMOUNTAIN REGION
1958

INSECT: Mountain Pine Beetle (Dendroctonus monticolae Hopk.)

HOST: Lodgepole pine, western white pine, and ponderosa pine.

Mountain pine beetle activity in the lodgepole pine forests of U. S. Forest Service Region 4* continues its upward trend. Many epidemic areas have increased in size and some new centers of infestation have developed. Through control efforts, some infestations have been reduced to endemic level, in others, while tree killing has been substantially reduced, significant populations still remain. The 1958 surveys show some 22 epidemic infestations on 5 national forests, one national park, and one on intermingled State, private and Federal lands. The infestations are scattered throughout the range of lodgepole in the region and range in size from small centers of several hundred trees to the large-scale epidemic on the Wasatch National Forest where approximately 90,000 trees are currently infested.

Mountain pine beetle infestations in lodgepole pine timber appear to be at a low level throughout Region 1.* Two small infestations have persisted for several years in Glacier National Park, neither has spread beyond the limits of the initial infestation.

No serious mountain pine beetle infestations in ponderosa pine are reported from U. S. Forest Service Region 1. In Region 4 the infestation in second-growth stands of ponderosa pine in the Crystal Bay area of Lake Tahoe, Nevada continues its aggressive tendencies. Control measures were undertaken in 1958 which resulted in more than 6,000 infested trees being removed by salvage logging or by cutting and burning. One infestation in second-growth ponderosa pine was recorded on the Boise National Forest. This infestation is at present limited in extent but potentially is serious.

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*U. S. Forest Service Region 1 includes Montana, northern Idaho, a portion of northeastern Washington, the northwestern corner of South Dakota. Department of Interior lands within the bounds and Yellowstone Park are included in surveys.

U. S. Forest Service Region 4 includes Utah, Nevada, southern Idaho, western Wyoming, and very limited forested areas in eastern California and western Colorado. Department of Interior lands within the bounds are included in surveys.

INSECT: Engelmann Spruce Beetle (Dendroctonus engelmanni Hopk.)

HOST: Engelmann spruce

Remnants of the 1952 destructive outbreak of the Engelmann spruce beetle persist in parts of Region 1, notably in the Kootenai and Flathead National Forests in northwestern Montana. Appraisal surveys show a small decline in numbers of trees attacked in 1958 compared with 1957. This year the Engelmann spruce beetle "blossomed out" throughout Region 4. Widely scattered, serious outbreaks were discovered on the Payette National Forest in Idaho; Bridger National Forest in Wyoming; Manti-LaSal, Dixie, Wasatch, Ashley, and Uinta National Forests in Utah. Most of the new epidemic areas occur in or near recent logging operations. Post mortems reveal that the beetles build up in logging slash, stumps, and in scattered blowdown, and that the buildups probably started about 3 years ago. In most cases, 1957 was the first year that standing green trees had been attacked to any extent. In all areas the parasite population was assessed as light and woodpecker numbers judged to be far below that required to be of material help.

The largest epidemic covers over 100 square miles and is located at the convergence of the Wasatch, Ashley, and Uinta National Forest boundaries. Control action was initiated against all of the outbreaks. In some cases the beetle populations were reduced to endemic levels while in others continued control efforts will be required to bring the epidemic under control.

INSECT: Douglas-fir beetle (Dendroctonus pseudotsugae Hopk.)

HOST: Douglas-fir

For the past several years the Douglas-fir beetle has been at a relatively low level in most of Region 4. During 1958 a distinct upward trend was noted in many stands of Douglas-fir. More centers of activity were found and two large areas containing approximately 600 trees were discovered on the Sawtooth and Payette National Forests. The outbreak on the Dixie National Forest in southern Utah continues at a high level.

Infestations of Douglas-fir beetle in Region 1 are increasing in number and destructiveness. Ten outbreaks have been reported by collaborators and several have been detected during aerial surveys by laboratory personnel in 1958. These outbreaks range in size from small localized areas to one covering 12,500 acres, the latter near the town of Avery on the St. Joe National Forest. Most outbreaks are in scattered locations in northeastern Washington, northern Idaho, and Montana west of the Continental Divide. Two current outbreaks east of the Divide have been reported on the Gallatin National Forest, Montana, and in Yellowstone National Park, Wyoming.

INSECT: Black Hills beetle (Dendroctonus ponderosae Hopk.)

HOST: Ponderosa pine

Control measures against the Black Hills beetle epidemic on the Dixie National Forest and Bryce Canyon National Park effected a decided reduction in the number of ponderosa pine infested in 1958 over 1957. Entomological data gathered this summer indicates the epidemic in the oldest area of infestation has started a definite downward trend.

INSECT: Western Pine Beetle (Dendroctonus brevicomis Lec.)

HOST: Ponderosa pine

Mortality of ponderosa pine caused by the western pine beetle remains at a low endemic level throughout Regions 1 and 4.

INSECT: Alpine Fir Engravers (Scolytus and/or Dryocoetes)

HOST: True firs

Fir engravers are at a high level in Forest Service Region 4. Damage is scattered throughout nearly all of the fir stands.

INSECT: Southwestern Pine Beetle (Dendroctonus barberi Hopk.)

HOST: Ponderosa pine

The southwestern pine beetle continues to kill ponderosa pine on the highly used recreational areas of Charleston Mountain near Las Vegas, Nevada. Constant maintenance type control throughout the active season has been in progress for several years. These efforts have reduced the rate of loss considerably.

INSECT: Lodgepole Pine Beetle (Dendroctonus murrayanae Hopk.)

HOST: Lodgepole pine

Small outbreaks of the lodgepole pine beetle have been reported in lodgepole pine forests in the Mill Creek and Beaver Creek drainages of the Gallatin National Forest, Montana. Beetle attacks appear to be confined to trees with previous top crown injury caused by porcupine feeding and bole attacks of an undetermined pitch moth.

INSECT: Spruce Budworm (Choristoneura fumiferana (Clem.))

HOST: Douglas-fir, true firs, Engelmann spruce

Since 1952 the spruce budworm has increased areawise in southern Idaho. The present year is the first since 1952 that severity of damage did not increase generally throughout the infested areas. The total acreage showing some defoliation in 1958 was approximately one million acres.

In Region 1, the spruce budworm picture shows the infestation to be generally static in nature with increasing trends at scattered locations. However, there are still about 3 million acres infested with spruce budworm.

INSECT: Spruce Mite (Oligonychus ununguis (Jac.))

HOST: Douglas-fir forests

Infestations of the spruce spider mite, first reported in 1957, persist on several national forests east of the Continental Divide in Montana. Biological evaluations made in 1958 show that mite populations remained heaviest in those areas sprayed for budworm control in 1956-1957. Without exception, mite populations were insignificant in areas that have not been sprayed.

INSECT: Pine Butterfly (Neophasia menapia (Feld.))

HOST: Ponderosa pine

Each year following the pine butterfly control program in 1954, special attention has been given to relative abundance of pine butterflies in Idaho. During the 1958 aerial surveys on the Salmon National Forest, sufficient numbers of adults were observed to cause concern. Ground examinations determined that approximately 50,000 acres of ponderosa pine were supporting an egg population approaching epidemic numbers.

INSECT: Douglas-fir Tussock Moth (Hemerocampa pseudotsugata McD.)

HOST: Douglas-fir and true firs

No active infestation of Douglas-fir tussock moth were reported in Region 1 in 1958.

Surveys in 1958 revealed that virus disease practically eliminated the outbreak, covering about 10,000 acres in Owyhee County, in southern Idaho. This is the second time in 10 years that a serious epidemic of tussock moth has been brought under control by a virus in this area.

INSECT: Tussock Moth

HOST: Range browse plants

A tussock moth, in epidemic numbers, fed on bitterbrush, willow, wild rose, and desert peach on the foothill ranges between Carson City and Reno, Nevada

INSECT: Larch Casebearer (Coleophora laricella (Hbn.))

HOST: Western Larch

A severe infestation of this insect was discovered in 1957 in the vicinity of St. Maries, Idaho. This infestation was the first western record of this forest defoliator. At that time visible defoliation extended over an area of 15,000

acres of western larch stands. A detection survey in 1958 showed that the casebearer is now present over 110 square miles in northern Idaho and northeastern Washington. Although no visible defoliation was observed outside the 15,000 acres reported in 1957, the casebearer was found in small numbers as far north as Sandpoint, Idaho, and Chewelah, Washington. No southern expansion of the infestation was found beyond Clarkia, Idaho.

INSECT: Black-headed Budworm (Acleris variana (Fern.))

HOST: Western hemlock and alpine fir

Fairly widespread infestations of black-headed budworm reported in 1956 and 1957, subsided in 1958 to a single infestation on the Kootenai National Forest in Montana. Here, damage to western hemlock stands, as observed during an aerial survey, was hardly visible. The 1958 Kootenai infestation covers approximately 1,500 acres.

The black-headed budworm caused light defoliation to approximately 50,000 acres of alpine fir in 1958. The infestation is located in southern Idaho and occurred mostly along high altitude ridge tops.

INSECT: Lodgepole Pine Needle Miner (Recurvaria milleri Busck)

HOST: Lodgepole pine

The lodgepole needle miner is now in epidemic numbers throughout most of the Cassia Division of the Sawtooth National Forest in Idaho. There is also a small infestation of about 1,500 acres west of Gerrit in the center of the extensive lodgepole pine stands of the Targhee National Forest. The previous outbreak that died out in 1953 covered a good share of the Sawtooth, Caribou, and Targhee National Forests.

INSECT: Tent Caterpillar

HOST: Deciduous trees and shrubs

Populations of the forest tent caterpillar, Malacosoma disstria Hbn., are prevalent in Region 1 for the first time in four seasons and appear to be increasing in Missoula County, Montana. Scattered infestations of Great Basin tent caterpillar, M. fragilis Stretch, were observed occasionally west of the Continental Divide in Montana but appear to be more numerous east of the Divide on a variety of shrubs, mainly Prunus, but also Rosa, Amelanchier and rarely Ribes. Caterpillar populations in the vicinity of Bozeman, Montana were strongly parasitized by ichneumonids which pupated within the skin of the half-grown host; most other caterpillars died, possibly of disease, before pupating.

Tent caterpillars were abundant throughout most of Region 4 in 1958. One of the more serious outbreaks occurred on the Cache National Forest along the Wasatch front facing the heavily populated Salt Lake valley. Mountain maple, chokecherry, and several browse plants were the most heavily attacked. A virus

disease attacked the mature larvae in this outbreak and succeeded in killing a very high percentage of the population before pupation took place. It is expected that although some local centers may develop on the Cache National Forest next year, they will probably be controlled by the virus disease. The forest tent caterpillar, Malacosoma disstria Hbn., was most prevalent but the Great Basin tent caterpillar, M. fragilis Stretch was also present.

INSECT: Aspen Leaf Miner (Phyllocnistis populiella Chamb.)

HOST: Aspen

The aspen leaf miner has been in epidemic status for about 10 years on four national forests in western Wyoming and southeastern Idaho. The infestation is still very active and this year, as in the past, nearly 100 percent of the foliage of all aspen trees within the infestation was heavily mined. On the Teton National Forest much of the foliage has been stunted as a result of continuous feeding. Many patches of dead aspen, ranging in size up to 10 acres, are scattered throughout the infestation and it is now felt that most of the mortality resulted from repeated heavy feeding by the leaf miner.

INSECT: Sawflies on Douglas-fir

HOST: Douglas-fir

Sawflies are causing noticeable defoliation in nearly all Douglas-fir stands of southern Idaho.

INSECT: Larch Sawflies

HOST: Western Larch

In July an infestation of the larch sawfly, Pristiphora erichsonii (Hartig), was discovered in Missoula County, Montana. This is the first record of this species in the northern Rocky Mountains since 1944.

For the past several years two sawflies--the two-lined (Anoplonyx occidens Ross) and the western (A. laricivorus Roh & Midd.)--frequently have been found associated with the larch looper, Semiothisa sexmaculata (Pack.), in larch stands of western Montana, northern Idaho, and northeastern Washington. Field observations indicate that both sawfly species have two generations per year in this region but their numbers in 1958 were too few to cause visible defoliation of larch.

INSECT: Spruce Mealybug (Puto sp.)

HOST: Engelmann spruce

The spruce mealybug infestation covering approximately 60,000 acres of spruce in southern Utah is still very active. For the most part the area of infestation has not increased this year. Continued heavy feeding within the infestation is rapidly reducing vigor of the mature spruce and is causing some deformity in the younger trees.

INSECT: Unknown Mealybug

HOST: True firs, pine, spruce

An infestation of mealybug approximately 6,000 acres in extent was found on the Payette National Forest. It was found on true firs, white bark pine, spruce, and lodgepole pine. Present damage does not appear serious.

INSECT: Pine Tip Moth (Rhyacionia sp.)

HOST: Ponderosa pine

A pine tip moth, Rhyacionia sp., caused considerable damage to natural reproduction of ponderosa pine Pinus ponderosa var. scopulorum Engelm., on the Long Pines section of the Custer National Forest, Montana. Similar infestations have also been reported in other parts of the Sioux Division of the forest. The infestation has apparently persisted for several years and similar infestations have been reported from this area as early as 1936.

INSECT: Aphid

HOST: Western white pine

An aphid tentatively determined as Pineus coloradensis Gill is associated with crown deterioration of western white pine in northern Idaho, western Montana, and eastern Washington. There has been a serious loss of 2- and 3-year-old needles. In 1958 the aphid was found distributed throughout the range of white pine in Region 1.

Rocky Mountain Forest and Range Experiment Station
Forest Insect and Disease Laboratory
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Forest Insect Conditions, Rocky Mountain Region 1958

A. E. Landgraf

Losses caused by forest insects increased during 1958; infestations totaled 851,570 acres. Current bark beetle losses exceed 20.6 million board-feet. The Engelmann spruce beetle is epidemic in several sale areas. Black Hills beetle populations increased nearly four times. Damage by the spruce budworm was more extensive; several incipient outbreaks were found. The Great Basin tent caterpillar is still epidemic in southern Colorado.

ENGELMANN SPRUCE BEETLE (Dendroctonus engelmanni Hopk.)

HOST: Engelmann spruce

CURRENT CONDITIONS: The Engelmann spruce beetle is epidemic in several spruce stands in Colorado. All the infestations are within or adjacent to timber sales. Cull material and scattered blowdown at the edges of leave strips provided the beetle with ideal host material, enabling large beetle populations to develop.

The outbreak on Missionary Ridge, San Juan National Forest contains an estimated 7,970 infested Engelmann spruce trees. The trees are in leave strips adjacent to logged areas. They will be logged or chemically treated. Thousands of infested cull logs are to be treated before the 1959 beetle flight.

Epidemic populations of spruce beetles were found in cull logs in timber sales on the Alder, Conejos, Creede, and Del Norte Districts on the Rio Grande National Forest. Thousands of cull logs are to be treated before the 1959 beetle flight.

Similar conditions exist in cull logs and standing trees on the Norwood District of the Grand Mesa-Uncompahgre National Forest. Chemical treatment is recommended for several thousand culls.

Spruce beetle populations are endemic in spruce blowdown on the Eagle and Holy Cross Districts of the White River National Forest. Three plots of 25 trees each were established and will be sampled again after the 1959 beetle flight.

TREND: Static in the undisturbed areas.

BLACK HILLS BEETLE (Dendroctonus ponderosae Hopk.)

HOST: Ponderosa pine

CURRENT CONDITIONS: Ponderosa pine mortality due to the Black Hills beetle is estimated at 4 million board-feet; area of infestation is 77,290 acres. An overall increase in Black Hills beetle populations occurred during 1958. Population sampling in Colorado and Wyoming show this increase to be about 4 to 1.

The Black Hills beetle is at an epidemic level on the Bear Mountain District of the Black Hills National Forest. In 1958, Forest crews treated a total of 4,085 infested ponderosa pines. Scheduled for control in 1959 are 7,010 trees, the majority of these being on the Bear Mountain District.

Maintenance control projects will be necessary on the Pike, San Isabel, and San Juan National Forests. Forest crews on these forests will treat a total of 670 infested ponderosa pines.

TREND: Increasing.

MOUNTAIN PINE BEETLE (Dendroctonus monticolae Hopk.)

HOSTS: Lodgepole pine and limber pine

CURRENT CONDITIONS: The mountain pine beetle continues to be epidemic in some areas on the Shoshone National Forest. The total acreage infested is estimated at 21,510 acres; losses are 4 million board-feet.

The infestation on Wiggins Fork, Wind River District, remains epidemic. An appraisal survey disclosed an estimated 9,700 infested lodgepole pine on 3,850 acres. This is an increase of 2,200 trees over the 1957 findings. Control by combinations of logging and chemical treatment has been recommended for 1959.

A smaller outbreak occurs on the West Fork of Long Creek, Wind River District. The Forest plans to treat the 600 infested lodgepole pines found in this drainage.

Mountain pine beetle populations are now at an endemic level in lodgepole and limber pine stands in drainages of the North and South Forks of the Shoshone River. Control projects in 1957 and 1958 treated a total of 11,810 infested trees. Only mop-up control will be necessary in 1959.

TREND: Static except on the Wind River District.

DOUGLAS-FIR BEETLE (Dendroctonus pseudotsugae Hopk.)

HOST: Douglas-fir

CURRENT CONDITIONS: This bark beetle is one of the most destructive forest insects in the central Rocky Mountains. Infestations total 41,330 acres in Colorado and Wyoming; losses are estimated at 4.8 million board-feet.

Douglas-fir beetle infestations total 13,270 acres on the San Juan National Forest. Epidemic infestations were found in Sand and Cold Creek drainages and on Devil Mountain of the Piedra District.

Moderate to heavy infestations were found on the Grand Mesa-Uncompahgre and San Isabel National Forests and the Sangre De Cristo Grant.

TREND: Increasing.

WESTERN BALSAM BARK BEETLE (Dryocoetes confusus Sw.) and FIR ENGRAVER (Scolytus ventralis Lec.)

HOST: All true firs

CURRENT CONDITIONS: These two bark beetles are present throughout the range of subalpine fir in Colorado and Wyoming. Aerial surveys in 1958 revealed 98,300 infested acres. Volume losses are estimated at 6.6 million board-feet.

Epidemic infestations occur on the Grand Mesa-Uncompahgre, Rio Grande, San Juan, White River, Medicine Bow, and Arapaho National Forests.

TREND: Increasing.

SPRUCE BUDWORM (Choristoneura fumiferana (Clem.))

HOSTS: Douglas-fir, true firs, spruce, ponderosa pine

CURRENT CONDITIONS: Light to heavy spruce budworm damage occurs on 172,210 acres in Colorado. This is a marked increase over the 1957 damage (89,500 acres). Incipient outbreaks were detected on the Pike and Rio Grande National Forests and the Sangre De Cristo Grant. Other infestations on the Rio Grande and San Juan National Forests increased in size and intensity.

TREND: Increasing.

GREAT BASIN TENT CATERPILLAR (Malacosoma fragile (Stretch))

HOST: Aspen

CURRENT CONDITIONS: For the past 9 years this insect has been epidemic in aspen stands in southern Colorado. On the Rio Grande and San Isabel National Forests where there has been repeated heavy defoliation, tree mortality is very noticeable; recreational and watershed values are being affected.

During 1958, light to heavy defoliation occurred on 130,990 acres of quaking aspen. An additional 1,180 acres were classified as dead.

Egg mass counts from trees in the infested areas changed very little in comparison to last year's count. Continued moderate to heavy defoliation is forecast for much of the infested area in 1959.

TREND: Static.

LARGE ASPEN TORTRIX (Archips conflictana (Wlkr.))

HOST: Aspen

CURRENT CONDITIONS: Light to moderate infestations totaling 220,450 acres occurred throughout aspen stands on the Grand Mesa-Uncompahgre, Gunnison, and San Juan National Forests. Heavy defoliation was confined to small patches. The degree of damage varies tremendously from year to year. The cause of this wide fluctuation is not known.

TREND: Unknown.

PINE NEEDLE MINER (Recurvaria sp.)

HOST: Ponderosa pine

CURRENT CONDITIONS: Two new infestations were found during the 1958 aerial survey; one in the vicinity of Durango, Colorado on private and national forest (San Juan) lands, the other is southwest of Colorado Springs. Damage is light in all areas; infestations total 86,470 acres.

TREND: Increasing.

SAWFLY (Neodiprion sp.)

HOST: Lodgepole pine

CURRENT CONDITIONS: An unidentified sawfly caused heavy defoliation of lodgepole pine growing on Deer and Goat Islands in Granby Reservoir. This outbreak was reported by the National Park Service boat patrol. Many of the sawfly larvae pupated before treatment could be applied. It may be necessary to spray the trees again in 1959.

TREND: Increasing.

FALL WEBWORM (Hyphantria cunea Drury)

HOSTS: Cottonwood, willows, chokecherry, alder, and many other deciduous trees.

CURRENT CONDITIONS: The fall webworm has damaged trees and shrubs in Cache La Poudre, Rist and Buckhorn Canyons west of Fort Collins, Colorado, and in other drainages south to Colorado Springs. The Colorado State Forest Service is planning to start a control program in Poudre Canyon in 1959.

TREND: Increasing.

Table 1.--Summary of forest insect infestations recorded during the 1957 aerial survey in Colorado, Wyoming, and South Dakota.

Insect	Infestations by intensities				
	Light	Moderate	Heavy	Very heavy	Total
	- - - - - - - - - - acres - - - - - - - - - -				
Bark Beetles					
Engelmann spruce beetle	1,600	580	790	50	3,020
Black Hills beetle	70,290	5,760	1,230	10	77,290
Mountain pine beetle	15,940	3,530	1,790	250	21,510
Douglas-fir beetle	27,090	13,260	980	0	41,330
Western balsam bark beetle and fir engraver beetle	56,830	36,550	4,070	850	98,300
Subtotal	171,750	59,680	8,860	1,160	241,450
Defoliators					
Spruce budworm	109,140	60,540	2,430	100	172,210
Great Basin tent caterpillar	28,880	54,470	47,640	0	130,990
Large aspen tortrix	205,080	15,190	180	0	220,450
Pine needle miner	86,470	0	0	0	86,470
Subtotal	429,570	130,200	50,250	100	610,120
Grand Total	601,320	189,880	59,110	1,260	851,570

IMPORTANT FOREST INSECT OUTBREAKS
ARIZONA, NEW MEXICO, & WEST TEXAS
1958

Insect activity decreased sharply throughout Region 3 during 1958. There were only 1,859,000 acres of infestation as compared with 3,251,000 acres in 1957.

A table summarizing the important forest insect outbreaks recorded in 1958 is attached. Each species is discussed in the order given in the table. Miscellaneous pests are not listed in the table. A map of the area served by the laboratory is attached.

PINE BARK BEETLES

1. INSECT: Ips and Dendroctonus spp. Arizona five-spined ips (Ips lecontei), Oregon pine ips (Ips oregonis), Western six-spined ips (Ips ponderosae), Southwestern pine beetle (Dendroctonus barberi), roundheaded pine beetle (Dendroctonus convexifrons), larger Mexican pine beetle (Dendroctonus parallelocollis).

HOST: Ponderosa pine.

CURRENT CONDITIONS: In 1958 an association of Ips and Dendroctonus species killed pine on 534,860 acres in Arizona and New Mexico. The initial attack usually was made by one or more species of Ips in the top portion of the tree with Southwestern pine beetles filling in and killing the basal portion of the tree. The other species of Dendroctonus were found to a limited degree. Areas suffering severe losses were on Fort Apache Indian Reservation and Coconino National Forest in Arizona, and the Cibola National Forest in New Mexico.

TREND: Decreasing.

2. INSECT: Black Hills beetle (Dendroctonus ponderosae).

HOST: Ponderosa pine.

CURRENT CONDITIONS: The 1957 outbreak of Black Hills beetles on 19,000 acres of the Carson National Forest, New Mexico, was successfully controlled by treating more than 500 infested trees with a water emulsion of ethylene dibromide. Forest Service personnel will conduct an operational survey in the spring of 1959 to determine the need for further control in the area.

TREND: Decreasing.

3. INSECT: Roundheaded pine beetle (Dendroctonus convexifrons).

HOST: Ponderosa pine.

CURRENT CONDITIONS: The small 1957 outbreak of roundheaded pine beetles on Mount Graham, Coronado National Forest, was controlled in August with a solution of ethylene dibromide in fuel oil. The control area was examined the last week in September, and no new attacks were noted.

TREND: Decreasing.

FIR AND SPRUCE BEETLES

4. INSECT: Douglas-fir beetle (Dendroctonus pseudotsugae).

HOST: Douglas-fir.

CURRENT CONDITIONS: Losses to Douglas-fir in 1958 from this bark beetle amounted to 245 million board-feet on 670,860 acres. Although this indicates a decrease in damage by the insect compared with the 1957 loss (96 million board-feet on 821,200 acres), the beetle population still remains at a high level and is active in the host type of the region. Much of the timber is inaccessible or of low commercial value. Areas which sustained the greatest losses were the Cibola, Santa Fe, and Gila National Forests in New Mexico.

TREND: Decreasing.

5. INSECT: Fir engraver beetle (Scolytus ventralis).

HOST: White fir.

CURRENT CONDITIONS: A fir engraver beetle infestation was discovered on the Lincoln National Forest this year. The heavy outbreak in mature and overmature white fir and Douglas-fir types is on an area of 4,480 acres. The beetle also continues its depredation of the white fir stand in the Sandia Mountains east of Albuquerque, New Mexico. The area of damage has increased to 10,000 acres, approximately 2,000 acres more than last year. Limited salvage of dead and dying trees is in progress in the Sandia Mountains.

TREND: Slight increase.

6. INSECT: Western balsam bark beetle (Dryocoetes confusus).

HOST: Alpine fir.

CURRENT CONDITIONS: Acreage infested by the Western balsam bark beetle decreased sharply in 1958, with 65,440 acres recorded as against 167,780 acres reported in 1957. Areas on the Santa Fe and Carson National Forests still suffer the greatest losses.

TREND: Decreasing.

7. INSECT: Engelmann spruce beetle (Dendroctonus engelmanni).

HOST: Engelmann spruce.

CURRENT CONDITIONS: An outbreak of this beetle is present in a 1,250 acre logging area on the Tierra Amarilla Grant, adjacent to the Carson National Forest west of Tres Piedras, New Mexico. Woodpecker feeding, aided by other natural control factors, eliminated a similar outbreak on an adjacent area and is expected to do so here. The infestation of Engelmann spruce beetles reported in 1957 on the Rancho Del Rio Grande Grant near Taos, New Mexico, remained static in 1958.

TREND: Slight increase.

DEFOLIATORS

8. INSECT: Spruce budworm (Choristoneura fumiferana).

HOST: Douglas-fir, true fir, and spruce.

CURRENT CONDITIONS: Defoliation of the host type by the spruce budworm throughout the region increased considerably in 1958, with moderate to heavy defoliation on 323,840 acres. The Carson and Santa Fe National Forests experienced the greatest buildup, with 139,960 and 65,160 acres of infestation respectively. Chemical control may be needed in this area in 1960 or 1961 if the present upward trend continues. In June 1958 the Forest Service and National Park Service treated 100,000 acres of mixed conifer on the North Kaibab Plateau, Arizona. Treatment was by an aerial application of 1 pound of DDT in fuel oil per acre. The budworm population was reduced by 96 percent.

TREND: Increasing.

9. INSECT: Douglas-fir tussock moth (Hemerocampa pseudotsugata).

HOST: White fir and Douglas-fir.

CURRENT CONDITIONS: Four separate outbreaks of this defoliator totaling 19,000 acres in white fir were active in 1958. The first, discovered in 1957, is on Pinal Mountain, Tonto National Forest, and covers 2,500 acres. In 1958, three new outbreaks were discovered--one 3,000 acres on Baker Mountain, Tonto National Forest; the second, a 12,000 acre area on Sandia Mountain, Cibola National Forest, and the third, a 1,500 acre area on Capitan Mountain, Lincoln National Forest. Defoliation in specific localities in the Pinal Mountain outbreak are severe; some trees have lost all of their foliage. Feeding intensity in other areas is light to heavy. No tree mortality has resulted. During June 1958 the Forest Service treated about 100 acres of heavily infested white fir on Pinal Mountain. Treatment was an aerial application of 1 pound of DDT in 1 gallon of fuel oil. The effectiveness of the treatment was limited.

TREND: Sharp increase.

10. INSECT: New Mexico fir looper (Galenara consimilis).

HOST: Douglas-fir and white fir.

CURRENT CONDITIONS: This defoliator, endemic since 1952, was found on Capitan Mountain, Lincoln National Forest in the fall of this year. This same area also is infested with Douglas-fir tussock moth. Separation of damage caused by either defoliator was impossible. Defoliation was evident on about 1,500 acres; 600 of which was heavy.

TREND: Unknown.

11. INSECT: Ponderosa pine sawfly (Neodiprion fulviceps complex).

HOST: Ponderosa pine.

CURRENT CONDITIONS: There was an increase in 1958 from 640 to 1,280 acres of ponderosa pine defoliation caused by this sawfly south of Grants, New Mexico. The infestation is heavy, but no tree mortality has resulted.

TREND: Increasing.

12. INSECT: Great Basin tent caterpillar (Malacosoma fragile).

HOST: Aspen.

CURRENT CONDITIONS: A slight downward trend in the activity of the Great Basin tent caterpillar continued in 1958. Defoliated acreage dropped from 250,690 to 223,620.

TREND: Slight decrease.

13. INSECT: Aspen leaf roller (Unidentified).

HOST: Aspen.

CURRENT CONDITIONS: Defoliation of aspens by a lepidopterous leaf feeder has risen from 500 to 1,280 acres on the Tres Piedras District, Carson National Forest.

TREND: Increasing.

14. INSECT: Needle miner (Recurvaria sp.).

HOST: Ponderosa pine.

CURRENT CONDITIONS: All outbreaks of this needle miner have disappeared. The areas infested in 1956 and 1957 were ground checked and no insects were found.

TREND: Subsided.

MISCELLANEOUS PEST

ARACHNIDS: Mites (Unidentified).

HOST: Douglas-fir.

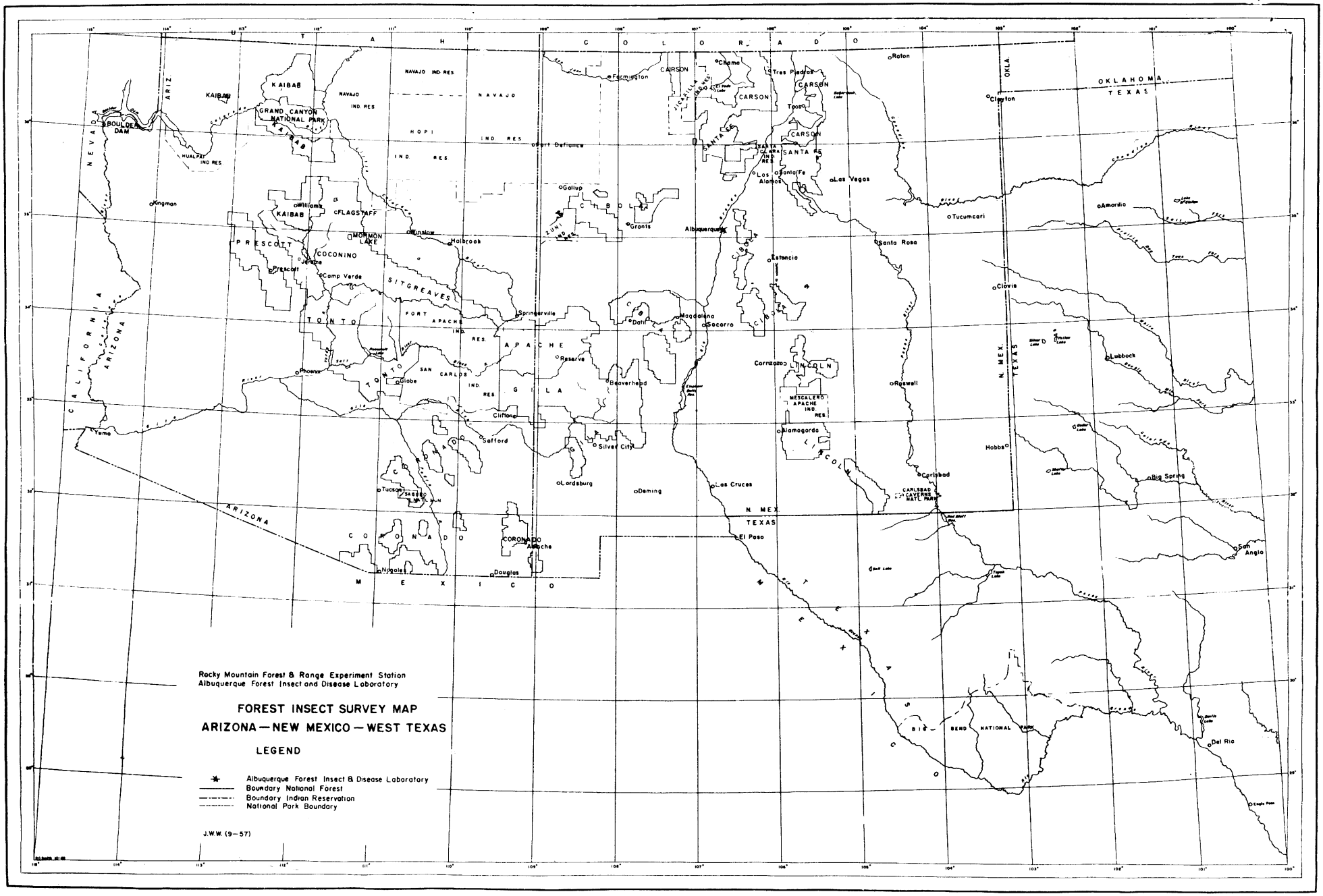
CURRENT CONDITIONS: The mite infestation on the Lincoln National Forest, which began in 1956, still covers about 50 acres.

TREND: Decreasing in intensity.

Summary of Forest Insect Epidemics Recorded
During the 1958 Survey in Arizona and New Mexico

Insect	Arizona	New Mexico	Total
		Acres	
Pine Bark Beetles			
1. Ips & Dendroctonus spp.	300,210	234,650	534,860
2. Black Hills beetle	0	0	0
3. Roundheaded pine beetle	0	0	0
Subtotal	300,210	234,650	534,860
Fir & Spruce Bark Beetles			
4. Douglas-fir beetle	103,280	567,580	670,860
5. Fir engraver beetle	0	16,280	16,280
6. Western balsam bark beetle	5,440	60,000	65,440
7. Engelmann spruce beetle	0	1,250	1,250
Subtotal	108,720	645,110	753,830
Defoliators			
8. Spruce budworm	100,000	223,840	323,840
9. Douglas-fir tussock moth	5,500	13,500	19,000
10. New Mexico fir looper	0	1,500	1,500
11. Ponderosa pine sawfly	0	1,280	1,280
12. Great Basin tent caterpillar	22,500	201,120	223,620
13. Aspen leaf roller	0	1,280	1,280
14. Needle miner (ponderosa pine)	0	0	0
Subtotal	128,000	442,520	570,520
Total	536,930	1,322,280	1,859,210

SUBMITTED BY: Forest Insect & Disease Laboratory, Rocky Mt. Forest & Range Experiment Station, Albuquerque, New Mexico.


Rocky Mountain Forest & Range Experiment Station
Albuquerque Forest Insect and Disease Laboratory
FOREST INSECT SURVEY MAP
ARIZONA — NEW MEXICO — WEST TEXAS
LEGEND
Albuquerque Forest Insect & Disease Laboratory
Boundary National Forest
Boundary Indian Reservation
National Park Boundary
J.W.W. (9-57)
UTAH
COLORADO
NEVADA
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
OKLAHOMA
MEXICO
KAIBAB
NAVAJO IND RES
HOPI IND. RES
HUALPAI IND RES
GRAND CANYON NATIONAL PARK
BOULDER DAM
PRESCOTT
COCONINO
FLAGSTAFF
MORMON LAKE
SITGREAVES
TONTO
FORT APACHE IND. RES.
SAN CARLOS IND. RES
APACHE
GILA
CORONADO
SANTA FE
CARSON
SANTA CLARA IND RES
JICARILLA APACHE IND RES
ZUNI
CIBOLA
LINCOLN
MESCALERO APACHE IND RES
CARLSBAD CAVERNS NAT. PARK
BIG BEND NATIONAL PARK
Kingman
Williams
Winslow
Holbrook
Prescott
Camp Verde
Phoenix
Globe
Tucson
Yuma
Safford
Clifton
Springerville
Reserve
Beaverhead
Silver City
Lordsburg
Deming
Las Cruces
El Paso
Douglas
Nogales
Gallup
Grants
Albuquerque
Magdalena
Socorro
Datil
Fort Defiance
Chama
Tres Piedras
Taos
Los Alamos
Santa Fe
Las Vegas
Farmington
Raton
Clayton
Tucumcari
Santa Rosa
Estancio
Clovis
Portales
Roswell
Carrizozo
Alamogordo
Hobbs
Carlsbad
Big Spring
Lubbock
Amarillo
San Angelo
Del Rio

IMPORTANT FOREST INSECT OUTBREAKS

California Region, 1958

Losses due to forest insects have decreased to some extent in California during 1958. With a few exceptions, bark-beetle damage in the principal timber-producing forests was below normal most of the year. In some of the high elevation recreational forests this was not the case. Lodgepole pine, in particular, continued to sustain severe infestations of the mountain pine beetle and lodgepole needle miner. Jeffrey pine in these forests was damaged by Jeffrey pine beetle. Late in the year, following one of the driest, warmest fall periods in the State's history, signs of increased bark-beetle activity began to show up in several localities throughout the State. However, it is too early to tell what these portend.

The status of the major insects can be summarized as follows: the western pine beetle in ponderosa pine decreased, particularly in areas around burns where in 1957 it was in outbreak; the mountain pine beetle in lodgepole pine increased statewide, but in sugar pine it was much less active than usual; the Jeffrey pine beetle was active in many parts of the State; the Douglas-fir beetle showed a few signs of increased activity in northwestern California but was not widely epidemic; the California flatheaded borer in ponderosa and Jeffrey pine remained in outbreak in southern California; pine engravers in ponderosa and Jeffrey pine caused little damage early in the year, but showed signs of increasing late in the fall; the fir engraver in the true firs was epidemic in only a few local areas; the lodgepole needle miner remained epidemic in lodgepole pine, with one new center of infestation discovered; seed and cone insects again caused serious damage; for the first time in many years Douglas-fir engraver infestations were common in young Douglas-fir in northwestern California.

Sanitation-salvage logging and salvage-logging infested trees continued to figure prominently in reducing bark beetle-caused losses thoughout the State.

Western pine beetle - *Dendroctonus brevicomis* Lec.

Host: Ponderosa pine and Coulter pine

Current conditions: Damage to ponderosa pine by this insect was quite localized. The principal localities where it was noted were the northern end of the Devils Garden area, Modoc County; Sacramento Canyon, Shasta County, where the damage was associated with recent right-of-way cuttings; and the Harris Mountain area, Siskiyou County. Infestations in Coulter pine in southern California were more prevalent and more severe. They occurred in Lost Valley, San Diego County; the San Jacinto area, San Bernardino County; and on Figueroa Mountain, San Luis Obispo County. Ponderosa pine in the latter area was also infested. Elsewhere, throughout most of the commercial timber zone, western pine beetle activity was at a low point.

Trend: Decrease statewide.

Mountain pine beetle - Dendroctonus monticolae Hopk.

Host: Lodgepole and sugar pines

Current conditions: The mountain pine beetle in lodgepole pine continued to be very destructive in Yosemite National Park, Tuolumne County, and the Skunk Cabbage Creek drainage, Modoc County. Upward trends in the activities of this insect were noted in lodgepole stands in Lassen Volcanic National Park, Shasta County; Buck Camp, Fresno County; and Reds Meadow, Inyo County. Mountain pine beetle outbreaks in sugar pine around 1955 burned areas were greatly reduced. This insect, like the western pine beetle, was at a low point in most of the mixed conifer stands where sugar pine occurs. The only exception was in the Hoopa Valley Indian Reservation and Bee Mountain-Pecwan areas, Humboldt County, where localized outbreaks occurred.

Trend: Upward in lodgepole pine, downward in sugar pine.

Lodgepole needle miner - Recurvaria milleri Busck.

Host: Lodgepole pine

Current conditions: This insect continued to ravage lodgepole pine stands on about 50,000 acres around Tuolumne Meadows, Yosemite National Park. It was abundant and caused some damage in lodgepole forests to the north, east and south on the Stanislaus and Inyo National Forests, and Sequoia-Kings Canyon National Park. The infestation found on the Stanislaus, in the Emigrant Basin Primitive Area, is a new record for this insect. Additional experiments in the spring and fall, with malathion sprays applied by a helicopter, showed that the needle miner can be controlled if large-enough volumes of spray are put on.

Trend: Continuing epidemic.

Jeffrey pine beetle - Dendroctonus jeffreyi Hopk.

Host: Jeffrey pine

Current conditions: This insect showed signs of increased activity in mature and overmature stands in Florence Lake-Mono Hot Springs area, Fresno County; in Lassen Volcanic National Park, Shasta County; and around Arrowhead and Big Bear Lakes, and the Camp Angeles-Barton Flats area, San Bernardino County. It also caused damage in large second-growth timber near Truckee, Placer County. The serious infestation reported last year in the Cannel Meadows area in Tulare County is being controlled by sanitation-salvage logging.

Trend: Continuing epidemic.

Douglas-fir beetle - Dendroctonus pseudotsugae Hopk.

Host: Douglas-fir

Current conditions: This insect continued in outbreak in the Grider Creek drainage, Siskiyou County, where it has been epidemic since 1954. Elsewhere, infestations remained at a comparatively low level, although on the Hoopa Valley Indian Reservation, Humboldt County, slight increases were noted.

Trend: Slightly upward.

Fir engraver - Scolytus ventralis Lec.

Host: White and red firs

Current conditions: Outbreaks of the fir engraver were quite localized for the State as a whole, and losses in total very moderate. Small pockets of heavy loss were observed in the South Warner mountains, Modoc County; in areas previously heavily defoliated by the Douglas-fir tussock moth in Calaveras and Tuolumne Counties; near Burney, Shasta County; and around Lake Tahoe in Placer and Eldorado Counties.

Trend: Slight upward trend from a low level in 1957.

Pine engravers - Ips confusus Lec. and I. oregoni (Eichh.)

Host: Ponderosa, Coulter and Jeffrey pine

Current conditions: Damage was very light in northern California and moderate in southern California most of the year. Increased activity was observed during the fall, particularly in Lake and Mendocino Counties. One very aggressive infestation by the California five-spined engraver was estimated to have killed about 1,000 second-growth ponderosa pine on about 1,000 acres. Very little associated western pine beetle was observed in this outbreak area.

Trend: Variable, upward in southern California and part of the North Coast, but at a low level elsewhere.

The California flatheaded borer - Melanophila californica Van D.

Host: Jeffrey and ponderosa pine

Current conditions: This insect continued to be epidemic alone or more commonly in association with other bark beetles in many pine stands of southern California. In some areas, such as Alamo Mountain and Mt. Pinos, Ventura County, sanitation-salvage now underway is expected to alleviate the losses to some extent. Infestations at Laguna Mountain and Corte Madera, San Diego County, and in the San Jacinto area, Riverside County, are being held in check by direct control. Maintenance control is also being considered for a mixed infestation of flatheaded borers and pine engravers near Wrightwood, San Bernardino County.

Trend: Continuing epidemic in southern California.

Seed and cone insects

Host: Jeffrey, ponderosa and sugar pine, Douglas-fir

Current conditions: Seed and cone insects continued to cause serious damage in 1958. Cone moths (Barbara and Dioryctria spp.), the Douglas-fir seed chalcid (Megastigmus spermotrophus Wachtl.), and midges (Contarinia sp.) destroyed about 75 percent of a good Douglas-fir cone crop throughout the Douglas-fir belt this year. Some areas were less severely affected than others, but generally damage was so great that it made collecting profitable in only a few locations. The Jeffrey and ponderosa pine cone crop suffered heavy damage from

pine seed moths (Laspeyresia and Hedula spp.) and moderate damage from the ponderosa-pine cone beetle, Conophthorus ponderosae Hopk. It is estimated that about one-half of the sugar-pine cone crop was destroyed this year by the sugar-pine cone beetle, Conophthorus lambertianae Hopk., but generally there were enough cones left to provide a better-than-average supply of seed this year.

Trend: Continuing at a high level.

Douglas-fir engraver - Scolytus unispinosus Lec.

Host: Douglas-fir

Current conditions: For the first time in many years this insect showed signs of aggressiveness. Numerous groups of young Douglas-fir were heavily infested late in the year on cutover lands in Humboldt and Mendocino Counties. Infestations were concentrated around Garberville and Miranda and in scattered locations southward. Trees from sapling size up to 24 inches in diameter were attacked. Most of the infested trees were in or near logging operations, not necessarily current.

Trend: Upward

Submitted by
California Forest and Range Experiment Station
Division of Forest Insect Research
Berkeley, California

January 22, 1959

IMPORTANT FOREST INSECT OUTBREAKS IN OREGON AND WASHINGTON 1/ IN 1958

By W. J. Buckhorn and P. W. Orr
Pacific Northwest Forest and Range Experiment Station
Forest Service
U. S. Department of Agriculture

GENERAL

Forest insect outbreaks in 1958 totaled slightly over 2 million acres, approximately the same as last year. The spruce budworm, balsam woolly aphid, Douglas-fir beetle, mountain pine beetle, and western pine beetle accounted for most of the acreage in this year's outbreaks.

Aerial spraying, coupled with natural control, reduced the infestation by the spruce budworm to the lowest point it has been since 1947, when detailed records were begun; the population trend is downward. Tree killing by the balsam woolly aphid declined, but the affected area expanded and the insect population flared up late in the season; biological control efforts were continued. A severe outbreak of the Douglas-fir beetle developed in southern Oregon; it is expected to begin to decline in 1959. Epidemic infestation by the mountain pine beetle increased about 20 percent in acreage, but still was about normal for this insect. The western pine beetle flared up generally in the pine region, becoming serious on a few areas.

Total acreage of all insect outbreaks is one indication of the relative seriousness of conditions from year to year. To fully interpret this figure, it is necessary to consider the destructiveness of the insects contributing to the total, and the intensity and status of the individual outbreaks. In general, 1958 was a somewhat better-than-average year for the forest manager in his efforts to hold the insect enemies in check. Totals for the years for which records are complete follow:

Acreage		Acreage	
1951	2,629,240	1955	2,248,820
1952	7,286,200	1956	1,410,660
1953	8,269,120	1957	2,129,440
1954	7,704,120	1958	2,032,720

1/ Exclusive of Lincoln, Pend Oreille, Spokane, Whitman, and parts of Ferry and Stevens counties in northeastern Washington, which are reported upon by the Intermountain Forest and Range Experiment Station, Ogden, Utah.

Table 1.--Forest insect epidemic infestations in Oregon and Washington, 1958.

Insects	Oregon		Washington		Region Total	
	Infestation centers	Area	Infestation centers	Area	Infestation centers	Area
	Number	Acres	Number	Acres	Number	Acres
Bark beetles:						
1. Douglas-fir beetle	672	880,160	118	51,320	790	931,480
2. a. Mountain pine beetle (W) 1/	67	32,160	486	190,880	553	223,040
b. Mountain pine beetle (L) 1/	58	36,640	11	5,920	69	42,560
c. Mountain pine beetle (P) 1/	4	2,560	0	0	4	2,560
3. Western pine beetle	78	96,640	91	56,080	169	152,720
4. Engelmann spruce beetle	9	4,640	14	3,840	23	8,480
5. Fir engraver beetle	35	11,120	46	10,880	81	22,000
6. Oregon pine ips	43	7,680	16	3,320	59	11,000
7. Silver fir beetles	0	0	25	4,720	25	4,720
All bark beetles	966	1,071,600	807	326,960	1,773	1,398,560
Defoliators:						
8. Spruce budworm	84	315,440	0	0	84	315,440
9. Larch bud moth	0	0	45	41,920	45	41,920
10. Spruce bud moth	14	4,800	1	480	15	5,280
11. Black-headed budworm	0	0	9	2,720	9	2,720
12. Pandora moth	1	1,600	0	0	1	1,600
13. Lodgepole pine sawfly	1	320	0	0	1	320
14. Ponderosa pine needle miner	1	160	0	0	1	160
All defoliators	101	322,320	55	45,120	156	367,440
Sucking Insects:						
15. Balsam woolly aphid	111	110,560	75	145,760	186	256,320
16. Pine needle scale	0	0	7	10,400	7	10,400
All sucking insects	111	110,560	82	156,160	193	266,720
All insects	1,178	1,504,480	944	528,240	2,122	2,032,720

1/ Mountain pine beetle infestations are separated by tree species: L = lodgepole pine; P = ponderosa pine; W = western white pine.

BARK BEETLES

1. DOUGLAS-FIR BEETLE (Dendroctonus pseudotsugae Hopk.)

Host: Douglas-fir.

Current conditions: Timber killing from attacks of the Douglas-fir beetle in 1957 showed up extensively in southwestern Oregon in the spring of 1958. Killing from attacks made this year continued at about the same rate as last year. Outbreaks were recorded from Lincoln County Ore., south into northern California, the most extensive being in the South Umpqua drainage and adjacent stands on the Rogue River National Forest. Considerable tree-killing also was recorded on the Siskiyou and Siuslaw National Forests. Other aggressive, but smaller, centers of infestation occurred on the Okanogan National Forest and Colville Indian Reservation in eastern Washington. Outbreaks for the entire region totaled 931,480 acres as compared with 18,400 acres last year. Considerable salvage logging to reduce beetle populations locally is in progress.

Trend: Broods in trees attacked in 1958 were lighter, indicating a likely downward trend in 1959. However, extensive blowdown evidently has occurred already this winter. This is likely to breed beetles that will attack green trees in numbers in 1960.

2. MOUNTAIN PINE BEETLE (Dendroctonus monticolae Hopk.)

Principal hosts: Western white pine, lodgepole pine, ponderosa pine.

Current conditions: For the region, outbreaks increased from 212,000 acres in 1957 to 268,160 in 1958. The bulk of this increase occurred in western white pine stands on the Gifford Pinchot, Snoqualmie, and Mt. Baker National Forests in Washington and on the Willamette National Forest in Oregon. Infestations in lodgepole pine and young ponderosa pine stands generally decreased in size and intensity in 1958. Salvage to utilize timber values where economically feasible is the only action being taken.

Trend: Fluctuating locally by tree species. No strong trend, either up or down.

3. WESTERN PINE BEETLE (Dendroctonus brevicomis Lec.)

Host: Ponderosa pine.

Current conditions: Increased tree-killing by this beetle was general. In Oregon, the increase was most evident on the Ochoco National Forest and Warm Springs Indian Reservation. In Washington, aggressive infestations were recorded on the Okanogan National Forest and on the Yakima and Spokane Indian Reservations. Generally the outbreaks still are in the light epidemic category, but the grouping that characterizes severe outbreaks is increasing. Sanitation-salvage is being speeded in the centers of heaviest kill.

Trend: Upward.

4. ENGELMANN SPRUCE BEETLE (Dentroctonus engelmanni Hopk.)

Host: Engelmann spruce.

Current conditions: Epidemic outbreaks occurred on 8,480 acres this year, as compared with 32,000 acres in 1957. In Washington, the largest acreage of epidemic killing was 1,920 acres on the Wenatchee National Forest. In Oregon, some 3,040 acres were recorded on the northern half of the Umatilla National Forest. Broods were generally light. No direct control is needed. Salvage of the dead and currently infested trees is in progress, but is limited by low values and lack of access.

Trend: Down.

5. FIR ENGRAVER BEETLE (Scolytus ventralis Lec.)

Principal hosts: Subalpine fir, grand fir.

Current conditions: Recorded outbreaks this year totaled 22,000 acres, approximately the same as last year. Tree-killing was about equally divided between Oregon and Washington, and mainly in subalpine fir in the Cascade Range, where timber values are low. No control is needed.

Trend: Static.

6. OREGON PINE IPS (Ips oregoni Eichh.)

Principal host: Ponderosa pine.

Current conditions: Damage by this beetle was the least in many years. Outbreaks totaled 11,000 acres, down from 28,640 acres in 1957. Proper handling of logging and thinning slash offers the most practical means of keeping losses to a minimum. Direct control is seldom, if ever, warranted.

Trend: Down.

7. SILVER FIR BEETLES (Pseudohylesinus sp.)

Principal host: Pacific silver fir.

Current conditions: Outbreaks in the northern Washington Cascade Range increased to 4,720 acres from the 1,120 recorded in 1957. Although tree-killing was far short of that experienced during the recent severe epidemic, and broods still appeared non-aggressive, the apparent upward trend warrants careful watching. No effective control measures have been developed, hence the only practical action is to utilize the timber on areas where tree-killing develops or is imminent.

Trend: Upward.

DEFOLIATORS

8. SPRUCE BUDWORM (Choristoneura fumiferana Clem.)

Principal Hosts: Douglas-fir, white fir, subalpine fir, ponderosa pine, lodgepole pine, Engelmann spruce.

Current conditions: This year's survey revealed residual populations in the Blue Mountains of central Oregon, and new outbreaks on two other areas in this state. Total acreage was 315,440, compared with 830,000 in 1957. Infestations in the Blue Mountain area were on or adjacent to the Ochoco, Malheur, and Wallowa-Whitman National Forests. The new outbreaks were in Dairy Creek drainage on the Fremont National Forest and in Fly Creek drainage on the Deschutes National Forest. Defoliation increased in area and severity on the Snake, Joseph, and Pine Creek units of the Wallowa-Whitman National Forest where no control is contemplated. Elsewhere defoliation was of light epidemic status. The current spruce budworm situation, based on 1958 feeding, is as follows:

Administrative Unit	Acres	Percent
Wallowa-Whitman N. F.	242,320	76.8
Fremont N. F.	38,880	12.3
Malheur N. F.	25,760	8.2
Ochoco N. F.	6,400	2.0
Deschutes N. F.	2,080	0.7
Total	315,440	100.0

Spraying in 1958 covered 818,000 acres, bringing the total sprayed since 1949 to 4,658,000 acres. Costs this year averaged $0.70 per acre. The estimated budworm kill was 96.2 percent.

Trend: Egg populations in all major infestations were sampled and found to indicate a general downward trend in most areas during 1959.

9. LARCH BUD MOTH (Zeiraphera griseana Hubn.)

Hosts: Western larch, Douglas-fir, white fir.

Current conditions: The epidemic infestations on western larch increased somewhat, with the largest being recorded on the Snoqualmie and Wenatchee National Forests. Previous epidemics on larch have disappeared without causing appreciable tree mortality. Sub-epidemic populations on Douglas-fir and white fir in both eastern and western Oregon have continued light and are causing no appreciable damage.

Trend: Temporarily upward.

10. SPRUCE BUD MOTH (Zeiraphera ratzeburgiana Sax.)

Host: Sitka spruce.

Current conditions: The extensive outbreak in spruce stands along the coastal areas of Oregon and Washington declined to a few small spots. These centers were largely on the Siuslaw National Forest. Damage from the defoliation was slight.

Trend: Downward.

11. BLACK-HEADED BUDWORM (Acleris variana Fern.)

Principal Hosts: In western Oregon and Washington - Western hemlock, Pacific silver fir, Douglas-fir. In eastern Oregon and Washington - Subalpine fir, white fir, Douglas-fir, Engelmann spruce.

Current conditions: From a peak of 252,800 acres in 1957 the outbreak in western Washington declined to 2,720 acres in 1958 and appears to be on its way out. Defoliation during this outbreak did not cause appreciable damage. The remaining infestation is centered on the Gifford Pinchot and Snoqualmie National Forests.

In eastern Oregon, a small sub-epidemic infestation on subalpine fir along the Tollgate-Troy ridge flared up in 1958, but apparently was quelled by high larval parasitism. Light populations are present throughout the fir and spruce stands in this part of the region, chiefly at higher elevations. In many stands the black-headed budworm populations are mixed with those of the spruce budworm.

Trend: Downward in western Washington; fluctuating in eastern Oregon.

12. PANDORA MOTH (Coloradia pandora Blake)

Host: Ponderosa pine.

Current conditions: A light infestation of this moth on ponderosa pine appeared along the McKenzie Highway on the Deschutes National Forest. Feeding of the new brood occurred during September and October of 1958, but the heavy feeding will occur in 1959 as the caterpillars mature. Thereafter, the pupae will remain in the ground a full year before moth emergence takes place. This infestation is in the same general area where an outbreak appeared 25 years ago, and subsided without appreciable damage to the stand.

Trend: Unknown.

13. LODGEPOLE PINE SAWFLY (Neodiprion sp.)

Host: Lodgepole pine.

Current conditions: A small spot of infestation appeared in lodgepole pine on the Willamette National Forest. Past history indicates no cause for alarm. An outbreak of this insect covered 69,700 acres on the Deschutes and Willamette National Forests in 1953 but subsided in 1954. In severely defoliated areas, only a small amount of tree mortality resulted.

Trend: Apparently upward.

14. PONDEROSA PINE NEEDLE MINER (Argyresthia sp.)

Host: Ponderosa pine.

Current conditions: Early in the season an outbreak caused extensive discoloration of foliage of ponderosa pine on the Warner District of the Fremont National Forest. This aroused fears that the attacked trees might be killed outright, or at least so weakened that they would fall prey to bark beetles. By the time the fall survey was made, most of the mined needles had dropped, leaving the trees in apparently good condition. At the time of pupation, the needle miner suffered considerable mortality.

Trend: Downward.

SUCKING INSECTS

15. BALSAM WOOLLY APHID (Chermes piceae Ratz.)

Hosts: Pacific silver fir, subalpine fir, grand fir.

Current conditions: Intensity of damage by the aphid decreased for the first year since discovery of the outbreak in 1954. However, very aggressive bole infestations were prevalent in the subalpine fir stands in the Cascade Range late in the season, indicating that the epidemic may increase in these areas in 1959. In Pacific silver fir stands, the heaviest centers of damage are still in the Green, Toutle and Kalama River drainages on the Gifford Pinchot National Forest. In this general area, considerable improvement in damaged trees in the Lewis River drainage was noted. In the subalpine fir type, the most extensive infestation is on the Willamette and Mt. Hood National Forests in Oregon. The insect was discovered in Mt. Rainier National Park for the first time, which marks the northernmost point it has been found in Washington.

Research on the aphid was given high priority in 1958. Six species of insect predators were imported from Europe and Asia to investigate the possibilities of biological control. Two of the species are at least temporarily established.

Trend: Upward in subalpine fir stands in 1959; static in Pacific silver fir and grand fir.

16. PINE NEEDLE SCALE (Phenacaspis pinifoliae Fitch)

Principal Host: Ponderosa pine.

Current conditions: Infestation on ponderosa pine around orchards in the vicinity of Wenatchee, Washington spread and became more conspicuous than usual. This type of infestation has been observed for several years and is attributed to the effects of spray drift from the orchards. One outbreak center was recorded on the Colville Indian Reservation.

Trend: Upward.

MISCELLANEOUS PEST PROBLEMS

BEAR DAMAGE

Damage caused by bears declined for the third successive year with damage recorded on 173,240 acres, as compared with 204,960 acres in 1957. The areas sustaining heaviest damage are on the Gifford Pinchot, and Olympic National Forests, and in southwestern Washington, north of Grays Harbor.

DYING HEMLOCK

The extent and severity of killing of western hemlock from unknown causes decreased. The current mortality, covering 46,400 acres, is heaviest on the Mt. Baker National Forest and southwestern Washington.

IMPORTANT FOREST INSECT OUTBREAKS

ALASKA - 1958

Forest insect activity in Alaska increased during 1958.

The spear-marked black moth infestation in birch near Fairbanks increased in intensity but disease and insect parasitism are believed to be bringing the epidemic to an end. The hemlock sawfly and the black-headed budworm combined to cause light to moderate defoliation of hemlock in the Ketchikan area. Alaska spruce beetle activity increased on the Kenai Peninsula and is approaching an epidemic condition in a few areas. Activities of most of the other forest insects in Alaska declined.

No direct or indirect control measures were undertaken against forest insects in Alaska in 1958.

Spear-marked black moth, Eulype hastata (L.)

Host: Paper birch.

Current conditions: This insect increased its activities over that of the previous year and was epidemic over a gross area of 5,829,000 acres. Heavy defoliation occurred on 333,000 acres. A sharp decline in the insect population occurred in mid-season, caused by a granulosis virus and insect parasitism.

Trend: Continue to decrease except for scattered pockets which may continue at epidemic levels.

Hemlock sawfly, Neodiprion tsugae Midd.

Host: Western hemlock.

Current conditions: Found in equal numbers with the black-headed budworm, causing light to moderate defoliation of hemlock in the Ketchikan area.

Trend: Some increase in population in general area of Ketchikan.

Black-headed budworm, Acleris variana Fern.

Host: Western hemlock.

Current conditions: Found in association with the hemlock sawfly in Ketchikan area.

Trend: Increasing population in Ketchikan area.

Alaska spruce beetle, Dendroctonus borealis Hopk.

Host: White spruce.

Current conditions: Ground and aerial reconnaissance of portions of the Kenai Peninsula in August found increased activity of this insect. Several large groups of recently dead and dying trees were evident along Resurrection, Palmer, Granite and Quartz Creeks.

Trend: Losses are expected to continue at a fairly high level within the presently infested areas.

Submitted by:

Alaska Forest Research Center
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January 1, 1959

IMPORTANT FOREST INSECT OUTBREAKS

Alberta Region

LARCH SAWFLY - Pristiphora erichsonii (Htg.)

Host - Tamarack

Current Conditions

The larch sawfly was present over a large part of Alberta in 1958. The infested area extended from Calgary north to Fort Smith in the Northwest Territories. Damage within this area varied from light to severe. A large area of severe defoliation occurred in the low lying land in the north eastern part of the Province from the Wabiskaw River to the Saskatchewan boundary and from Wabiskaw Lake to Fort Smith, Northwest Territories. The area from Edmonton north to Fawcett Lake and from Whitecourt on the west to Cold Lake on the east was also severely defoliated. Estimates of defoliation in this second area were complicated by short needle production as a result of previous defoliation. Small patches of heavy defoliation and moderate to light infestations occurred throughout the rest of the area where tamarack grows.

Trend - Increasing.

FOREST TENT CATERPILLAR - Malacosoma distria Hbn.

Host - Trembling aspen and hybrid poplar

Current Conditions

Patches of light to heavy defoliation occurred in a wide band from Lloydminster to the Peace River block in the north central part of the Province. In central Alberta the heaviest patches occurred near Elk Point where a small area was heavily defoliated. In southern Alberta this insect defoliated hybrid poplars in and around Lethbridge. Although few areas of heavy defoliation were reported this insect is much more wide spread than last year and unless weather conditions intervene a large scale outbreak can be expected.

Trend - Increasing

SPRUCE BUDWORM - Choristoneura fumiferana (Clem.)

Hosts - White, western white, and Engelmann spruce

Current Conditions

(a) The two-year-cycle Spruce budworm in the National Parks was very scarce in 1958 and defoliation was not noticeable. One third of the larvae in Banff Park which were collected in the spring were dead. There was no evidence of disease in the larvae examined.

SPRUCE BUDWORM - Choristoneura fumiferana
Current Conditions.....continued

(b) One-year-cycle-Spruce budworm infestations were active along the Slave River in northeastern Alberta and near Wadlin Lake in north central Alberta. Moderate to heavy damage occurred for about one hundred miles along the Slave River between Fort Smith and Great Slave Lake. Near Wadlin Lake spruce and balsam fir in the lower fifteen miles of the Muddy River, a tributary of the Wabiskaw, were severely defoliated. The infestation along the Mackenzie River was not visited in 1958.

Trend - Increasing

LODGEPOLE NEEDLE MINER - Recurvaria starki Free.

Host - Lodgepole pine

Current Conditions

Needle miners in the National Parks remained at a low level in 1958.

Trend - Static

DEFOLIATION OF ASPEN

Much of the aspen along the Eastern Slopes as far north as the Athabasca River were severely defoliated by the Bruce spanworm and three species of leaf rollers. Aspen through much of the rest of the southern half of the Province was also affected. Infestations were patchy ranging from light to severe. The insects responsible for this defoliation were Bruce spanworm, Operophtera bruceata (Hulst.) the large aspen tortrix, Choristoneura conflictana (Wlk.), Pseudexentera sp and Compsolechia niveopulvella Cham.

Trend - Increasing or Static

Submitted by:

Forest Biology Laboratory,
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January 19, 1959.

IMPORTANT FOREST INSECT OUTBREAKS

BRITISH COLUMBIA - 1958

SPRUCE BUDWORM, Choristoneura fumiferana (Clem.) (one-year-cycle)

Principal host: Douglas fir, Pseudotsuga taxifolia (Poir.) Britt.

Current conditions: The total area of the outbreak in the Lillooet River and Lake region was 653 square miles, an increase of 155 square miles compared with 1957. Of this area 92 square miles were classified as having suffered heavy defoliation, 41 square miles medium, and 520 square miles light.

Heavy defoliation occurred from Tenas Lake to Gowan Creek, around Blackwater Lake, in spots along the Anderson and Seton lakes, below Lillooet on the Fraser River, and in the upper Anderson River Valley. In the first locality many trees lost all their 1958 foliage, many of their 1957 needles, and some trees had up to 15 feet of their tops completely stripped.

Trend: Although there was a small over-all decrease in the number of egg masses compared with 1957, this decrease was not significant. The disposition of the egg masses also changed with decreases noted in 15 localities and increases in 10. The outlook for 1959 is generally light defoliation with heavy feeding in localized areas. Chemical control has not been recommended.

SPRUCE BUDWORM, Choristoneura fumiferana (Clem.) (two-year-cycle)

Principal hosts: Alpine fir, Abies lasiocarpa (Hook.) Nutt.; white spruce, Picea glauca (Moench.) Voss.; Engelmann spruce, Picea engelmanni (Parry) Engelm.

Current conditions: The area of the two-year-cycle budworm infestation in the Babine Lake area was calculated at 1,286 square miles, an increase of 294 square miles compared with 1956. Defoliation of white spruce and alpine fir was heavy. Loss of current foliage ranged from 75 to 100 per cent and averaged 95 per cent, loss of foliage older than one year averaged 43 per cent. Top kill on six plots ranged from four to 54 per cent.

Trend: The average number of egg masses per 18-inch branch sample increased from 2.2 in 1956 to 3.7 in 1958 in the Babine Lake area. Egg masses were also numerous on lodgepole pine. On the basis of egg counts a general increase in spruce budworm populations is expected in the Prince Rupert District in 1959. Chemical control has not been recommended.

BLACK-HEADED BUDWORM, Acleris variana (Fern.)

Principal hosts: Western hemlock, Tsuga heterophylla (Rafn.) Sarg.; Douglas fir, Pseudotsuga taxifolia (Poir.) Britt.

Current conditions: The black-headed budworm infestation on northern Vancouver Island has completely collapsed. There are no other outbreaks in British Columbia at the present time.

DOUGLAS-FIR BEETLE, Dendroctonus pseudotsugae Hopk.

Principal host: Douglas-fir, Pseudotsuga taxifolia (Poir.) Britt.

Current Conditions: The occurrence of red-topped trees killed by the Douglas-fir beetle in some regions of the Kamloops Forest District and in the Quesnel area, Prince George Forest District, increased in 1958. Highest incidence of attack was in areas of greatest sawmill concentration and logging activity. In the Nelson Forest District infestations were discovered at White Swan Lake and Wigwam River. There was a general increase of the beetle throughout the Slocan and Upper Arrow Lake valleys.

Trend: The general trend is upward and is most pronounced in the Cariboo region.

MOUNTAIN PINE BEETLE, Dendroctonus monticolae Hopk.

Principal hosts: Western white pine, Pinus monticolae Dougl., lodgepole pine, Pinus contorta Dougl. var. latifolia Engelm.

Current conditions: There was a general increase in the number of infested white pine in the Nelson Forest District. Infestations were noted from Arrow Park northward along Arrow lakes in the Slocan Valley, on Halfway Creek where 350 red-topped trees were recorded, on Hoder Creek, between Revelstoke and Frisby Creek, and near Blue River.

A small increase in the infestation of lodgepole pine was noted near Joe's, Helena, and Place lakes. Decreases were recorded in the outbreak along the western side of the upper Columbia Valley along Frances Creek and about Whitetail Lake.

The mountain pine beetle outbreak in lodgepole pine along the east shore of Babine Lake in the Prince Rupert Forest District decreased in intensity. On three main areas of heavy infestation covering 23 square miles total tree mortality was calculated at approximately 28 million cubic feet.

Trend: A general trend is not discernible, although there is an upward trend in populations in western white pine.

ENGELMANN SPRUCE BEETLE, Dendroctonus engelmanni Hopk.

Principal host: Engelmann spruce, Picea engelmanni (Parry) Engelm.

Current conditions: In the Nelson Forest District attacks by the Engelmann spruce beetle continued although at a declining rate. The population is relatively high in the upper valley of Bighorn Creek where 54 per cent of mature spruce stems have been beetle-killed. At Grave Creek almost the entire 1958 attack occurred within five chains of logging slash. Active beetle populations persisted at Watson, Russel, and Grave creeks, and subsided in Cabin, Storm, and Sage creek valleys.

Trend: The spruce beetle populations are expected to continue their downward trend.

BALSAM WOOLLY APHID, Adelges piceae (Ratz.)

Principal host: Amabilis fir, Abies amabilis (Dougl.) Forb.

Current conditions: The balsam woolly aphid is now known to occur in North and West Vancouver, the east side of Howe Sound and New Westminster. Infested trees were found up to the 3,500 foot level on Mt. Seymour, and may extend higher. Amabilis fir is the primary host, but scattered grand fir trees were also attacked. The balsam under attack is mainly in predominantely hemlock stands, and approximately 80 per cent of the trees are attacked. Indications are that the balsam woolly aphid has been present in these areas at least eight years.

Trend: Some tree mortality has occurred, and should increase in the next few years in view of the heavy stem and gout attacks now present.

WESTERN HEMLOCK LOOPER, Lambdina fiscellaria lugubrosa (Hulst.).-

Principal host: Western hemlock, Tsuga heterophylla (Rafn.) Sarg.

Current conditions: Populations of the western hemlock looper increased appreciably in the province during 1958. Although no serious defoliation was observed the increases are of considerable concern.

Trend: Uncertain, but could become a problem in 1959.

GREEN-STRIPED FOREST LOOPER, Melanolophia imitata Wlk.

Principal hosts: Western hemlock, Tsuga heterophylla (Rafn.) Sarg., Douglas fir, Pseudotsuga taxifolia (Poir.) Britt.

Current conditions: This looper increased in both distribution and intensity in 1958. The largest population was in Stanley Park, Vancouver, where in conjunction with the western hemlock looper and other insects noticeable defoliation was caused to overstory mature trees. The park was sprayed with 10 per cent DDT on July 26 to prevent further damage.

Trend: Uncertain, but this looper is expected to increase in intensity in 1959.

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January 7, 1959.